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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/016,054

12/06/2001

David J. Nelson

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7590

07/29/2004

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EXAMINER

LIANG, LEONARD S

ART UNIT

PAPER NUMBER

2853

DATE MAILED: 07/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/016,054	Applicant(s) NELSON ET AL.	
	Examiner Leonard S Liang	Art Unit 2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 May 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-50 is/are pending in the application.
- 4a) Of the above claim(s) 16-25, 47 and 48 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15, 26-46, 49, and 50 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-4, 6, 10-12, 26-36, 39-40, and 44-46 rejected under 35 U.S.C. 103(a) as being unpatentable over Sievers et al (US Pat 5639441) in view of Coulter (US Pat 3457949).

Sievers et al discloses:

- {claim 1} A printhead for delivering a solvent free marking material to a receiver (fig 3, ref 52 ; column 4, lines 7-9); a discharge device having an inlet and an outlet, a portion of the discharge device defining a delivery path, a portion of the discharge device being adapted to be releasably connected to a pressurized source of a thermodynamically stable mixture of a fluid and a marking material at the inlet, the discharge device being configured to produce a shaped beam of the marking material, the fluid being in a gaseous state at a location beyond the outlet

of the discharge device (figure 1, reference 20, 22; column 11, lines 44-67;
column 12, lines 15-36)

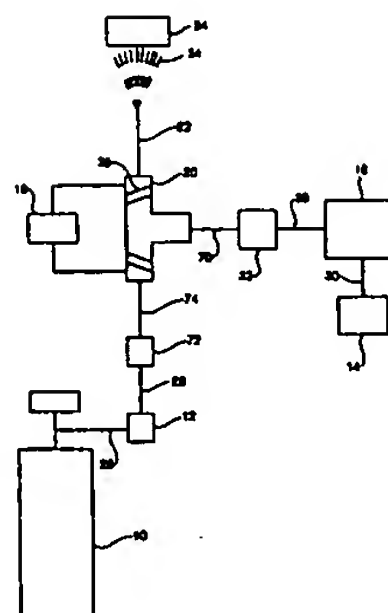


FIG. 1

- {claim 10} a predetermined amount of a marking material and a supercritical fluid in a thermodynamically stable mixture, wherein the canister is releasably connectable to a discharge device (figure 1, reference 20)
- {claim 11} A printing apparatus comprising a pressurized source of a thermodynamically stable mixture of a fluid and a marking material (figure 1); a printhead, portions of the printhead defining a delivery path, the delivery path of the printhead being connected to the pressurized source, the printhead including a discharge device, the discharge device having an outlet, a portion of the discharge device being positioned along the delivery path, the discharge device being shaped to produce a shaped beam of the marking material, the fluid being in a gaseous state at a location beyond the outlet of the discharge device
- {claim 12} a receiver retaining device positioned a predetermined distance from the outlet of the discharge device (figure 1, reference 24)

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- {claim 26} a source of fluid connected to the pressurized source (figure 1, reference 10, 14)
- {claim 27} a source of marking material connected to the pressurized source (figure 1, reference 14)
- {claim 28} the pressurized source includes an inlet adapted to receive the marking material (figure 1, reference 30)
- {claim 46} a receiver positioned on a surface of the receiver retaining device (figure 1, reference 24)
- {claims 49-50} the marking material is solvent free when the fluid is in the gaseous state at the location beyond the outlet of the discharging device (column 6, lines 49-51; though Sievers et al does disclose embodiments where a supercritical fluid is mixed with a solvent, it also discloses embodiments where this is not the case, such as when two supercritical fluids are used; in this scenario, the marking material is solvent free when the fluid is in the gaseous state at the location beyond the outlet of the discharging device)

Sievers et al differs from the claimed invention in that it does not disclose:

- {claim 1} a solvent free marking material; an actuating mechanism positioned along the delivery path, the actuating mechanism having a first position removed from the delivery path and a second position in the delivery path
- {claim 2} the discharge device includes a variable area section
- {claim 3} the discharge device includes a constant area section

- {claim 4} the discharge device includes a first variable area section connected to one end of a first constant area section, and a second variable area section connected to another end of the first constant area section
- {claim 6} the actuating mechanism includes a position controllable actuating mechanism
- {claim 11} a solvent free marking material; an actuating mechanism positioned along the delivery path, the actuating mechanism having an open position at least partially removed from the delivery path
- {claim 29} the discharge device has a variable area section
- {claim 30} the discharge device includes a constant area section
- {claim 31} the discharge device includes a first variable area section connected to one end of a first constant area section, and a second variable area section connected to another end of the first constant area section
- {claim 32} a second constant area section connected to the second variable area section
- {claim 33} the second constant area section having a first predetermined diameter, the second variable area section having a second predetermined diameter, wherein the first predetermined diameter is substantially equal to the second predetermined diameter
- {claim 34} the second predetermined diameter is a maximum diameter of the second variable area section

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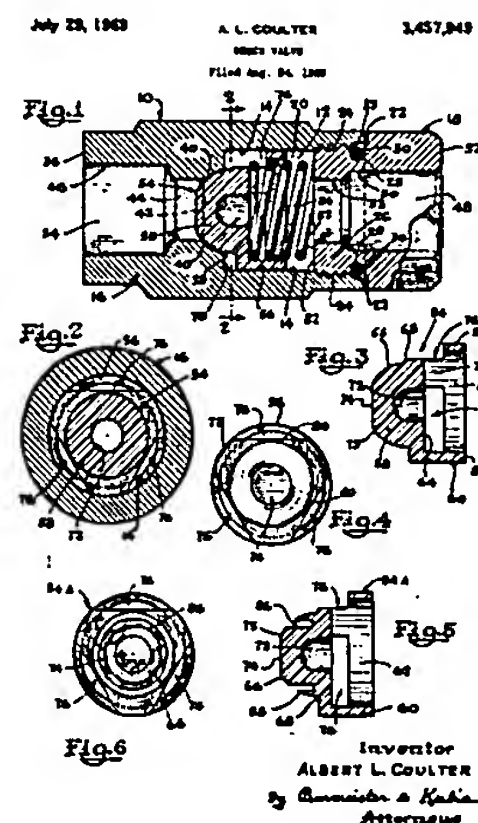
- {claim 35} the first constant area section having a third predetermined diameter, the first variable area section having a fourth predetermined diameter, wherein the third predetermined diameter is substantially equal to the fourth predetermined diameter
- {claim 36} the fourth predetermined diameter is a minimum diameter of the first variable area section
- {claim 39} the first constant area section having a predetermined length, wherein the length of the first constant area section is from about 0.1 to about 10 times the diameter of the first constant area section
- {claim 40} the actuating mechanism includes a position controllable actuating mechanism
- {claim 44} the actuating mechanism includes a conical sealing element moveable between the open position and a closed position
- {claim 45} the actuating mechanism includes a discloses shaped sealing element moveable between the open position and a closed position

Sievers et al discloses, with respect to claims 1 and 11, mixing a desired solid (i.e. claimed solvent free marking material) with a supercritical fluid (i.e. claimed fluid; column 2, lines 46-63). Sievers et al also discloses “It is an object of this invention to increase the range of substance which can be delivered as fine particles by rapid pressure reduction on a carrier fluid. It is also an object of this invention to increase the range of substances which can be formed into fine particles by supercritical fluid precipitation. At present only substances which are soluble in pressurized or supercritical fluid, with or without the aid of cosolvents and surfactants, are

amenable to such processes. This invention provides a process for forming fine particles of substances which are soluble in fluids, preferably non-gaseous fluids, immiscible with the pressurized or super-critical fluid. This expands the range of substances which can be delivered and eliminates the need for co-solvents and surfactants.” It is clear from this disclosure that the two step process disclosed by Sievers et al is meant to expand and not restrict the field of invention. It is also clear that though the main embodiment of Sievers et al does not disclose a thermodynamically stable mixture of a fluid and a solvent free marking material, Sievers et al does imply that scenario as known in the art.

Coulter discloses

- {claim 1} an actuating mechanism positioned along the delivery path, the actuating mechanism having a first position removed from the delivery path and a second position in the delivery path (figure 1 reference 54)



- {claim 2} the discharge device includes a variable area section (figure 1, reference 40)
- {claim 3} the discharge device includes a constant area section (figure 1, drawn in)

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- {claim 4} the discharge device includes a first variable area section connected to one end of a first constant area section, and a second variable area section connected to another end of the first constant area section (figure 1, reference 40; column 1-6)
- {claim 6} the actuating mechanism includes a position controllable actuating mechanism (figure 1; column 1, lines 12-44)
- {claim 11} an actuating mechanism positioned along the delivery path, the actuating mechanism having an open position at least partially removed from the delivery path (figure 1; column 1, lines 12-44)
- {claim 29} the discharge device has a variable area section (figure 1, reference 40)
- {claim 30} the discharge device includes a constant area section (figure 1; drawn in)
- {claim 31} the discharge device includes a first variable area section connected to one end of a first constant area section, and a second variable area section connected to another end of the first constant area section (figure 1, reference 40; column 1-6)
- {claim 32} a second constant area section connected to the second variable area section (figure 1; drawn in)
- {claim 33} the second constant area section having a first predetermined diameter, the second variable area section having a second predetermined diameter, wherein the first predetermined diameter is substantially equal to the

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second predetermined diameter (figure 1, reference 40; drawn in second constant area)

- {claim 34} the second predetermined diameter is a maximum diameter of the second variable area section (figure 1, reference 40)
- {claim 35} the first constant area section having a third predetermined diameter, the first variable area section having a fourth predetermined diameter, wherein the third predetermined diameter is substantially equal to the fourth predetermined diameter (figure 1, reference 40; drawn in first constant area)
- {claim 36} the fourth predetermined diameter is a minimum diameter of the first variable area section (figure 1, reference 40; segment both minimum and maximum diameter)
- {claim 39} the first constant area section having a predetermined length, wherein the length of the first constant area section is from about 0.1 to about 10 times the diameter of the first constant area section (figure 1)
- {claim 40} the actuating mechanism includes a position controllable actuating mechanism (figure 1; column 1, lines 12-44)
- {claim 44} the actuating mechanism includes a conical sealing element moveable between the open position and a closed position (figure 1, reference 54)
- {claim 45} the actuating mechanism includes a discloses shaped sealing element moveable between the open position and a closed position (figure 2)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teachings of Coulter into the invention of Seivers et al.

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The motivation for the skilled artisan in doing so is to gain the benefit of providing a valve which controls the flow of the marking material.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teachings of Sievers et al. The motivation for the skilled artisan in doing so is to gain the benefit of of forming aerosols and vapors that can be used in a variety of medicinal and industrial uses (column 1, lines 18-26).

2. Claims 5 and 37-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sievers et al (US Pat 5639441) in view of Coulter (US Pat 3457949), as applied to claims 1-4, 6, 10-12, 26-36, 39-40, and 44-46, and further in view of Matsumoto et al (US at 5949456).

Sievers et al, as modified, teaches all limitations of the claimed limitation except for the following:

- {claims 5 and 37} the diameter of the first constant area section is from about 20 microns to 2,000 microns
- {claim 38} the diameter of the first constant area section is from about 10 microns to about 20 microns

Matsumoto et al discloses:

- {claims 5 and 37} the diameter of the first constant area section is from about 20 microns to 2,000 microns (column 5, lines 24-25)
- {claim 38} the diameter of the first constant area section is from about 10 microns to about 20 microns (column 5, lines 24-25)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teachings of Matsumoto et al into the invention of modified Sievers et al. The motivation for the skilled artisan in doing so is to gain the benefit of having dimensions adequate for proper discharging and proper sealing when the need arises.

3. Claims 7-8, and 41-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sievers et al (US Pat 5639441) in view of Coulter (US Pat 3457949), as applied to claims 1-4, 6, 10-12, 26-36, 39-40, and 44-46, and further in view of Shrivastava et al (US Pat 5461401).

Sievers et al, as modified, teaches all limitations of the claimed limitation except for the following:

- {claims 7 and 41} the actuating mechanism includes a solenoid actuating mechanism
- {claims 8 and 42} the solenoid actuating mechanism is actuatable at a plurality of frequencies

Shrivastava et al discloses:

- {claims 7 and 41} the actuating mechanism includes a solenoid actuating mechanism (solenoid valve; abstract; column 1, lines 48-58)
- {claims 8 and 42} the solenoid actuating mechanism is actuatable at a plurality of frequencies (abstract; column 1, lines 48-58)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teachings of Shrivastava et al into the invention of modified Sievers et al. The motivation for the skilled artisan in doing so is to gain the benefit of

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providing a valve which can regulate the flow of material being discharged through the nozzles and allowing the valve system to obtain higher operating frequencies (abstract).

4. Claims 9 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sievers et al (US Pat 5639441) in view of Coulter (US Pat 3457949), as applied to claims 1-4, 6, 10-12, 26-36, 39-40, and 44-46, and further in view of Ishikawa et al (US Pat 4739347).

Sievers et al, as modified, teaches all limitations of the claimed limitation except for the following:

- {claims 9 and 43} the position controlling actuating mechanism is positioned adjacent to a solenoid actuating mechanism

Ishikawa et al discloses:

- {claims 9 and 43} the position controlling actuating mechanism is positioned adjacent to a solenoid actuating mechanism (column 3, lines 60-68; column 4)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teachings of Ishikawa et al into the invention of modified Sievers et al.

The motivation for the skilled artisan in doing so is to gain the benefit of providing a valve to moderate flow control.

5. Claims 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sievers et al (US Pat 5639441) in view of Coulter (US Pat 3457949), as applied to claims 1-4, 6, 10-12, 26-36, 39-40, and 44-46, and further in view of Wang (US Pat 6145980).

Sievers et al further teaches the printhead is rigidly connected to the pressurized source such that the printhead is stationary (figure 1, reference 22).

Sievers et al, as modified, differs from the claimed invention in that it does not disclose:

- {claim 13} the receiver retaining device being moveably positioned relative to the printhead
- {claim 14} the receiver retaining device is moveable in a first direction and a second direction relative to the printhead
- {claim 15} the second direction is substantially perpendicular to the first direction

Wang discloses:

- {claim 13} the receiver retaining device being moveably positioned relative to the printhead (column 1, lines 60-64; column 3, lines 26-27)
- {claim 14} the receiver retaining device is moveable in a first direction and a second direction relative to the printhead (column 1 lines 60-64; column 3, lines 26-27)
- {claim 15} the second direction is substantially perpendicular to the first direction (column 1, lines 60-64; column 3, lines 26-27)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teachings of Wang into the invention of modified Sievers et al. The motivation for the skilled artisan in doing so is to gain the benefit of not needing the complex machine structure of a printhead carriage in order to perform marking on a recording media.

Response to Arguments

6. Applicant's arguments with respect to claims 1-15, 26-46, 49 and 50 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Jagannathan et al (US Pat 6595630) discloses a method and apparatus for controlling depth of deposition of a solvent free functional material in a receiver.

Subramaniam et al (US Pat 5833891) discloses methods for a particle precipitation and coating using near-critical and supercritical antisolvents.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leonard S Liang whose telephone number is (571) 272-2148. The examiner can normally be reached on 8:30-5 Monday-Friday.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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PRIMARY EXAMINER
07/23/04